

HSC 03/131 (ANNEX C)

## **MANUFACTURE AND STORAGE OF EXPLOSIVES REGULATIONS: REGULATORY IMPACT AND COMPETITION ASSESSMENT (POST- CONSULTATION)**

### **Purpose and intended effect**

#### **Issue**

1. Over the years the Explosives Act (1875) has been overlaid with a considerable volume of secondary legislation. This has led to a situation where dutyholders and enforcing authorities find it difficult to understand what the law requires. These proposals retain the fundamental features of the existing framework whilst updating the requirements to take account of changes in the industry and technology. The consolidation and reduction in the volume of legislation is intended to make it easier for dutyholders to understand what is required of them and to provide comprehensive guidance on good practice.

#### **Risk assessment**

2. There were 10 events reported under the Explosives Act in 1999/00 causing a total of 4 injuries. Using past levels of risk as a guide we would expect an average of 11 events per year causing an estimated 0.3 fatalities and 3 injuries. In the HSE enforced explosives sector there were 3 major, 33 over 3 day injuries and 7 dangerous occurrences reported to HSE under RIDDOR. These injuries were not all explosion related and many had other causes (e.g slips/trips, contact with machinery).

3. There has not been an off-site fatality as a result of an explosion at an explosives site in the past fifty years. However tests by the MoD have suggested that the current separation distances for smaller stores holding high explosives may not provide sufficient protection against flying debris. The proposals for new separation distances for stores holding high explosives are intended to ensure that the risks to an individual living near to an explosives site are less than one in a million per year.

#### **Objectives**

4. The primary objectives of the review of explosives legislation were to reduce the volume of legislation and to make it easier for those who have to comply with the regulations to understand what the law requires. This would be done through consolidating the safety requirements and guidance on good practice into one document. There was also a need to update the requirements to take account of technical and other changes, in particular the trend from factory based production of explosives to on-site mixing.

#### **Options considered**

5. An alternative option would be to leave the existing legislation in place. While this would have avoided the costs of developing and implementing the new regulations this would have been outweighed by the additional costs to industry, local authorities and HSE of maintaining the existing system.

6. The proposals largely maintain the fundamental framework of the Explosives Act including licensing and enforcement responsibilities. HSE published a Discussion Document at the end of 1999 seeking views on a number of issues particularly with the regard to the role of local authorities in the regime. The majority of the respondents were in favour of maintaining the fundamental framework. In

broad terms the existing framework is felt to have worked well in maintaining a high level of safety without undue burdens on industry; respondents felt that more fundamental changes to the legislation would create unwarranted disruption which would not be justified by the safety benefits.

### **Information sources**

7. Staffordshire University have carried out a survey of explosives stores for HSE, the research included estimating the impact of the proposed revision of separation distances. Information used in this RIA comes from this research and a company that manufactures explosives stores. All costs and benefits are estimated in 2002/03 prices over a ten year period, then annualised in line with Treasury guidance. The discount rate used was 3.5% for costs/cost savings and 1.5% for health and safety benefits again in line with the most recent Treasury guidance.

## **Benefits**

### **Health and safety benefits**

8. While the proposals largely carry forward existing requirements, it is expected that they will yield health and safety benefits through increased compliance. Duty holders will find it easier to understand what the law requires of them and will also have better access to comprehensive guidance on good practice.

9. There are three main areas where new or revised requirements will be introduced.

- increased separation distances for certain types of explosive store. The major impact of these would be in avoiding the construction of explosives stores in areas of high population density;
- the licensing of facilities for the storage of ammonium nitrate emulsions;
- the proposal to give local authority licensing authorities the power to revoke or refuse a licence where either the place is not suitable for storage of explosives or the licensee is not a fit person to hold an explosive licence.

10. These measures will lead to general safety benefits through the prevention of explosives incidents and in mitigating their effect if they did occur. If we assume that 50% of the injury accidents reported under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) in the HSE enforced sector are caused by explosions then the number of accidents caused by explosions reported under RIDDOR would be 1 major, 19 over 3-day and 4 dangerous occurrences per year. We add to these the estimated 11 events causing 0.3 fatalities and 3 over 3-day injuries per year reported under the Explosives Act.

11. The cost to society of these injury accidents is estimated at £550,000 per year<sup>1</sup>. In addition to this there is the cost of damage and production loss caused by the explosions which we assume to be an average of £30,000 for an incident reported under the Explosives Act and £3,000 for a dangerous occurrence reported under RIDDOR. This leads to a total cost to society from explosion related incidents estimated at around £900,000 per year. If these proposals prevent 10% of the cost of

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<sup>1</sup> Using average unit costs of accidents of the various severalties taken from the HSE publication "The costs to Britain of workplace accidents and work related ill health in 1995/96"

explosion-related incidents per year then the total health and safety benefit to society is estimated at £90,000 per year. Total health and safety benefits discounted over 10 years would be estimated at around £800,000. When annualised, this is £80,000.

### Cost Savings

12. The major cost savings would derive from a reduction in training and administration costs to duty holders and enforcers as a result of the simplification and clarification of the regulatory requirements. For example, at present anyone wishing to find out what quantities of fireworks can be kept in registered premises must refer to four separate Orders-in-Council.

13. We have assumed that at each site in the HSE enforced sector and at each Local Authority (LA) licensed store three people need to be familiar with the requirements of the Explosives Act. For registered premises we assume that one person at each site needs to be familiar with the requirements of the Act. There are 176 local authorities in Great Britain, if each of them has an average of two trading standards/local authority officers responsible for the regulation of stores then the total number of officers is 352. The New Earnings survey 2000 gives the hourly wage of a production, works and maintenance manager of £16.17, we add to this one third non wage labour costs to give us a full economic cost of £21 per hour. Estimates of the total numbers of people who need to be familiar with the requirements of the Explosives Act are shown in the table below.

Table 1 : Numbers of people who need to be familiar with the requirements of the Explosives Act by sector.

Sector	Number	Full economic cost per hour
HSE enforced Sector	1,220	£21
Mines and Quarries	2,000	£21
LA licensed stores	423	£21
Registered premises	33,320	£21
Trading standards / local authority officers	352	£21
HSE (HID explosives inspectorate)	25	£38 <sup>2</sup>
Police	150	£26
<b>Total</b>	<b>37,490</b>	

14. If we take labour turnover as 10% then the total number of people needing to become familiar with the Explosives Act each year is estimated at around 3,750. We assume that the simplification of the legislation will save approximately half a day's time for each person needing to be familiar with it at premises in the HSE enforced sector and at LA licensed stores. For HSE inspectors, trading standards officers and the police we also assume time saving of one half day for each person needing to become familiar with the legislation. For those operating registered premises we assume that the time saved is equal to one half hour for each person needing to become familiar with the legislation. Using the full economic costs per hour shown in the table above yields a cost saving of around £65,000 per year. Over a ten year

(a) 2.HSE Full cost ready reckoner.

period total discounted cost savings from a reduction in familiarisation time are estimated at around £560,000. When annualised, this is £56,000.

15. There may also be operational benefits as dutyholders will be better able to understand what is required of them if their circumstances change and through easier access to consolidated guidance on good practice. These are estimated at two hours per year for dutyholders in the HSE enforced sector and at LA licensed stores, and an average of one quarter hour per year for those operating registered premises. This leads to a total operational benefit to dutyholders estimated at £305,000 each year, and £2.6 million over ten years in present value terms. When annualised, this is £260,000. Operational benefits to HSE and trading standards officers are calculated in the section below.

### **Cost savings to enforcement authorities**

16. The proposals will reallocate enforcement responsibilities at stores holding less than two tonnes of high explosives, giving the police responsibility for enforcing the requirements of these regulations as well as the requirements of the Control of Explosives Regulations (COER) At the moment smaller stores are inspected by the police and by the local authorities. They are generally in remote areas and combining the two inspections could yield significant savings in travelling time and costs. It is proposed that the police should become responsible for the enforcement of health and safety at these stores as well as security. This would apply to around 100 stores that are typically visited by local authorities once every two years. If we assume average travelling time of two hours and a distance of 40 miles for each store at a total cost of £18 per hour and £0.40 per mile then this leads to a yearly cost saving of £2,900. Discounted over a ten year period cost savings would be £25,000. When annualised, this is £2,500.

17. There will be operational benefits to HSE and trading standards officers stemming from an overall simplification of the regulations that will make enforcement less time consuming. For trading standards/local authority enforcement officers we estimate that this operational benefit will be one day per year for each officer. This leads to a yearly cost saving of £50,000 and a total cost saving discounted over 10 years of £450,000. When annualised, this is £45,000. For HSE we estimate that the operational benefits will amount to half a person year each for a band 3 inspector and a band 3 administrator. This leads to yearly cost saving to HSE of approximately £55,000 per year and a total cost saving discounted over 10 years of £475,000. When annualised, this is £47,500.

### **Costs**

#### **Business sectors affected**

18. There are an estimated 423 local authority licensed explosives stores in Great Britain, the split between those holding fireworks, general explosives and small arms munitions is shown in the table below. There are also an estimated 33,320 registered premises, these are split between the larger Mode A (i.e. a separate store) premises (7.4%) and the smaller (ie storage box/steel cabinet within a room) Mode B (92.6%).

**Table 2 : Estimate of number of LA licensed stores by type of explosives**

<b>Explosive Type</b>	<b>Number</b>	<b>Percentage</b>
Fireworks	118	27.8%

General Explosives	293	69.2%
Small Arms Munitions	11	2.6%
No data	1	0.4%
<b>Total</b>	<b>423</b>	<b>100%</b>

### *Stores holding high explosives*

19. The revised separation distances for stores holding high explosives are intended to ensure that the risks to an individual living near to an explosive site are less than one in a million per year. The new tables will also distinguish between steel stores and those built of brick and concrete as in certain circumstances the latter will present a greater hazard. The tables will also take into account safety measures such as mounding and the removal of the detonator annex.

20. For the majority of stakeholders (those keeping more than 150kg in a steel store) the impact of these changes will be limited - at most they will have to remove the detonator annex from the store and fix it to a separate hard standing. There is a potentially significant impact on three groups of high explosives storeholders

- those keeping in brick and concrete stores;
- those keeping less than 150kg in a steel store;
- those keeping in registered premises which are presently not required to maintain separation distances.

21. Staffordshire University have carried out a survey of explosives stores for HSE. This has found that most of the stores in the first two groups would be unaffected because they are in remote locations. Of the third category HSE estimates that there are no more than 30 stores nationwide.

### *Stores holding Fireworks*

22. For stores holding fireworks the intention is to ensure consistency between the local authority and HSE sectors. The tables local authorities are required to use impose the same separation distances for fireworks as for high explosives (when explosive content is compared rather than gross weight). The distances required by HSE are significantly less - reflecting the fact that the primary hazard is fire/heat radiation. The effect of adopting the present HSE tables for fireworks would depend on the amount stored. For smaller stores with no present requirement to maintain a safety distance it would result in an increase in the distance, while for larger stores it would result in a decrease.

### *Ammonium Nitrate Emulsions*

23. The proposals extend the scope of the regulations to include the preparation of ammonium nitrate emulsions; these emulsions are mixed on-site with fuel oil to produce an explosive. This would affect around 3 firms operating 3 sites.

### *Public Sector*

24. The safety requirements of the regulations will apply to the manufacture and storage of explosives by the Crown; the main impact of this will be on the Ministry of Defence (MoD).

## **Compliance costs to business, charities and voluntary organisations**

### *Stores holding high explosives*

25. Where the revised separation distances are not able to be met in the current location of the store, store holders will have several options. They could re-site the existing store on their own premises, this could involve the purchase of a new store or the moving of the existing one. Where there is no suitable place in their current premises they may have to rent land at another location to site the explosive store, this will usually involve the purchase of a new store.

26. As mentioned above research found that the main impact will be on those storing in registered premises where there is no current requirement for separation distances. The cost of a steel explosive store suitable for around 15-20kg of high explosives would be around £7,500 including installation. If the premises had an existing alarm system then the costs of wiring in the explosive store to the alarm would be around £200, if an alarm system had to be purchased then the cost would be £4,500.

27. If there is nowhere in their existing premises to site the store that is able to meet the separation distance requirements then the store holder may need to rent additional land upon which to site the store. A separation distance of 38m will require an area of land approximately 4,500m<sup>2</sup>. In rural areas where it is envisaged most stores will be located the land will have a rental cost of approximately £250 per year.

28. Some registered premises may not be in day to day use for the storage of explosives and may just be kept if needed (e.g. stores at police stations, airports). The legislation may cause the sites concerned to review their existing practices. HSE have agreed an exemption for stores containing very small amounts. An example of this could be a store containing a few grammes to train sniffer dogs.

29. If 25 of the registered premises need to purchase and install new stores then the cost in the first year will be between approximately £190,000 and £300,000. If 10 of the registered premises needed to rent additional land then the extra cost would be £2,500 per year and £20,000 discounted over 10 years. Total compliance costs to registered premises holding high explosives would then be in the range of £210,000 - £320,000 discounted over 10 years. When annualised, this is between £21,000 - £32,000.

#### *Ammonium nitrate emulsions*

30. We believe that the proposals reflect current practice within the industry and as such we expect the cost implications to be minimal. This view may change as we receive further information.

#### *HSE-licensed sector*

31. Regulation 13 requires that the applicant obtain the assent of the local authority before HSE grants a licence for an explosives factory, or a store holding more than 2 tonnes of explosive. Changes to the assent procedure will require the applicant to make a reasonable effort to inform those who might be affected by the proposed factory or store. At present applicants are simply required to place an advert in the local press. It is envisaged that in most cases a mailing to the occupants of the neighbouring properties affected would be sufficient to comply with the new regulations. This is unlikely to involve significant additional cost due to the low number of applications (four or five) that HSE receives each year and the likelihood that most proposed sites will be in areas of low population density.

#### **Familiarisation Costs**

32. Dutyholders and enforcement officers will have to become familiar with the revised regulations. Familiarisation costs are calculated using our estimates of the number of people needing to be familiar with the Explosives Act in Table 1 and assuming that familiarisation time will one day for those in the HSE enforced sector, trading standards officers, HSE inspectors and police officers and one hour for dutyholders at registered premises and licensed stores. These times are based on the fact that dutyholders and enforcers may already be familiar with the fundamental

framework of the Explosives Act. Given these times total familiarisation costs would be £1.1 million in the first year of the regulations. When annualised, this is £110,000.

### **Total compliance costs**

33. Total discounted compliance costs are estimated at between £1.3 and £1.4 million over ten years, the majority of the cost occurring in the first year that the regulations are introduced. When annualised, this cost is between approximately £130,000 and £140,000.

### **Impact on small and medium sized businesses**

34. The main impact would be on those small and medium sized businesses (SME's) that currently store high explosives in registered premises and would now be required to maintain a separation distance around the store. If the existing store had to be moved or a new store purchased then this would involve additional cost. There may also be nowhere on the SME's current premises to site the store that would comply with the required separation distances. If this was the case then they would have to rent additional land to site the store. Only a minority of the registered premises storing high explosives would be small businesses with the rest being large businesses or hobbyists (cavers, divers etc.).

### **Other costs**

#### *Public sector*

35. The MoD currently issues non-statutory permissions ('licences') for its own sites under the terms of a delegated authority from the Secretary of State. It would be administratively very burdensome for HSE to seek to license all MoD explosive sites, so the proposal is that MoD would continue to operate its permissioning system under delegated authority from the Secretary of State for Defence. The safety requirements of the regulations will apply in full to the MoD but as these reflect existing practice we expect the cost impact to be minimal.

### **Total costs to society**

36. The total costs to society are equal to the compliance costs to industry, excluding the cost of renting land which is a transfer. Total costs to society are therefore estimated at between around £1.3 and £1.4 million over ten years, in present value terms. Of this between £200,000 and £300,000 are policy costs and £1.1 million implementation costs. Annualised, total costs are between £130,000 and £140,000, with approximately £20,000 to £30,000 consisting of policy costs, and £110,000 implementation costs.

### **Environmental impacts**

37. None, except the prevention of explosives incidents that also have an environmental impact

### **Balance of costs and benefits**

38. Total quantified costs to society are estimated at around £1.3 to £1.4 million over ten years in present value terms, or £130,000 to £140,000 when annualised. Total quantified benefits are estimated at around £570,000 per year, £5 million over ten years in present value terms or £500,000 when annualised. This implies a net benefit from introducing the revised regulations of approximately £3.6 to £3.7 million over ten years, or £360,000 to £370,000 when annualised.

### **Arrangements for monitoring and evaluation**

39. To be determined.

### **Regulatory impact and competition analysis**

### *Product markets*

40. The principal product markets affected by the proposals would be:

- munitions and armaments
- fireworks and pyrotechnics
- shooters powders and small arms ammunition
- packaged explosives
- the bulk and on-site mixed explosives
- sale of explosives services to the construction and quarrying industries

41. While these are the principal product markets there are a number of other individual products and services of which explosives are a component and which would to some degree be affected by his regulations. These include: Christmas crackers; party poppers; car airbags and seatbelt pre-tensioners; as well as drilling products used in the offshore oil and gas industry and film and theatre special effects.

### *Geographical markets*

42. The overwhelming majority of fireworks and other pyrotechnics are manufactured in China and other Pacific Rim countries and imported into the UK.

43. Most blasting explosives are manufactured on-site and therefore by definition in the UK. Packaged explosives are almost entirely manufactured in the UK as are munitions. The only exceptions are detonators and some specialist such as shaped charges used in the offshore oil industry.

### *Barriers to entry*

44. There are a number of regulatory controls that restrict entry to the market. The principal controls are:

- controls on the transport and dangerous goods and movement through ports;
- licensing and other requirements for the manufacture and storage explosives.

45. Obtaining a manufacturing license involves both satisfying the requirements of HSE, but also obtaining the assent of the local authority. In some circumstances this may be a significant task. However, in HSE's experience the most significant difficulty for anyone wishing to establish a manufacturing operation is the need to obtain land and planning permission. It is also likely that the very low prices for explosives in the UK (significantly lower than in the rest of Europe) are the major deterrent to market entry.

### **Competition filter**

46. The proposals have been considered using the competition filter recommended by the Office of Fair Trading. In the case of a number of the markets covered by the proposals there were market concentration issues:

- in consumer fireworks one company has an estimated market share greater than 20 per cent and the top three companies have a combined market share approaching 50 per cent;
- the munitions market is also divided between a few large firms;
- virtually the sole producer of packaged explosives in the UK is a joint venture between two firms;

- two firms account for over 95 per cent of the production of ammonium nitrate emulsions – although it is important to stress that ammonium nitrate emulsions are only one part of the market for bulk on-site mixed explosives.

47. At the same time the proposals pass the other competition filter tests in that:

- in general they do not create new or additional barriers to market entry;
- they do not impose substantial additional new costs on new entrants as opposed to incumbent firms;
- they do not impose disproportionate costs on one type of firm.

48. However there are some qualifications to add to these general conclusions:

- while in the large majority of cases the proposals would not affect some firms substantially more than others. However a very small number of firms with small stores may be adversely affected by changes to the separation distance requirements;
- there are concerns that changes to the controls on the amounts of fireworks that may be kept in shops will mean that traditional outlets (eg newsagents shops) and specialist retailers will face greater competition from supermarkets;
- in most cases the regulations would not lead to higher set-up costs for new or potential firms compared with the costs for existing firms. However there are some transitional provisions that will give existing licensees time to comply with the revised requirements on separation distances. Given that the majority of firms will be unaffected by these proposals the affects of these transitional provisions are likely to be minimal. The decision to require licences for the manufacture of ammonium nitrate would result in higher entry costs for any new entrant when compared with existing manufacturers (who already manufacture on sites that are covered by licences). This is discussed in more detail below.

#### *Initial conclusions*

49. The conclusion of the competition filter suggested by OFT is that the proposals are unlikely to have an impact on competition. However the issue of the impact on the market for bulk on-site mixed explosives is discussed in more detail below.

#### *Licensing of manufacture of ammonium nitrate emulsions*

50. The market for bulk on-site mixed explosives comprises two main sets of products. The first of these are ammonium nitrate emulsions. These are mixed on-site with gas and fuel to produce an explosive. The second is ammonium nitrate mixed with fuel oil (ANFO). In most to circumstances this latter products is a viable substitute for use of emulsions -on both price and technical grounds.

51. In the major producers of ammonium nitrate emulsions are Orica and Exchem who between them produce significantly more than 95% of the product used in this country. Most of the ANFO used in this country is produced by quarrying operators themselves (although it should be noted that a significant proportion of the explosives-grade ammonium nitrate is supplied by Exchem and Orica). The ability of quarry operators to manufacture ANFO is a significant check on the ability of Exchem and Orica to raise the prices of their product. Indeed, it is arguable, that the

most significant deterrent to entry into this market is the very low level of prices that manufacturers can obtain for their product.

52. HSE has proposed bringing the manufacture of ammonium nitrate emulsions into the same framework as the manufacture of explosives. At the same time, it has been concerned not to introduce fresh market distortions.

53. The initial HSE proposals were to require the licensing of all storage of AN emulsions. The intention was to avoid putting the manufacturers of these products at a disadvantage relative to quarry operators. However representations from a number of respondents argued that this would tend to give quarry operators an incentive to use ANFO rather than use emulsions. In particular HSE received representations of that this proposal would force one company to exit the market with a detrimental impact on competition.

54. In HSE's view, it is unclear what the implications for competition would be given both the extremely small market share held by the firm concerned, and the availability of a very close substitute in the form of ANFO. Nevertheless, HSE has recognised that the proposal would have significantly disadvantaged manufacturers of AN emulsions in general, and that this would potentially have had a disproportionate impact on the smallest firm in the market. In the light of this, HSE has modified its proposals so that only the manufacture of AN emulsions would require a licence - the regulations will apply to the storage of this product that it will be exempt from the requirements for a storage licence.

55. HSE recognises that it could be argued that the requirement for manufacturers of ammonium nitrate to hold a licence would be a barrier to entry. However, while not wishing to minimize the task faced by anyone wishing to obtain a licence, in HSE's view this is not the primary deterrent to market entry. In any event, in HSE's view the public policy arguments for adopting the proposal significantly outweigh the largely theoretical competition issues: the ease with which quarry operators can manufacture ANFO for themselves means that the market for on-site mixed explosives is a competitive one and will remain so.